Confined Space Program

1.0 Scope and Application

The following procedures describe safe operating practices in confined spaces. These may be sewers, pipelines, tanks, boiler compartments, ducts, vaults, pits, vats, bins or silos, which may lack oxygen or have dangerous air contamination and be of such configuration that it would be difficult to remove a suddenly disabled person.
This program applies to all Cal Poly employees who conduct work in University identified confined spaces.

2.0 Definitions

Acceptable Entry Conditions

The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant

An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned.

Authorized Entrant

An employee who is authorized by the University to enter a permit required confined space.

Confined Space

A space that:

a. Is large enough and so configured that an employee can bodily enter and perform assigned work;
b. Has limited or restricted means for entry or exit; and
c. Is not designed for continuous employee occupancy.

Double Block and Bleed

The closure of a line, duct or pipe by closing and locking or tagging two in line-valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Entry Permit

The written or printed document that is provided by the University to allow and control entry into a permit-required confined space (permit space). The permit is based on the hazard identification and evaluation for that confined space. The entry permit defines the conditions under which the permit space may be entered; states the reason(s) for entering the space; lists the eligible attendants, entrants, and the individuals who may be in charge of the entry; and establishes the length of time for which the permit may remain valid.

Entry Supervisor
The qualified person (such as Facilities Services manager, trades supervisor, or EH&S) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operation, and for terminating entry as required. Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required for each role he or she fills. The duties of the entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazardous Atmosphere
An atmosphere which may expose employees to a risk of death, incapacitation, impairment of ability to self rescue (escape unaided from a permit space), injury or acute illness from one of more of the following causes:

a. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL):
b. Airborne combustible dust at a concentration that meets or exceeds its LFL (approximated as a condition in which the dust obscures vision at a distance of five feet (1.52 m) or less);
c. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent volume;
d. An atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in CCR Title 8, Section 5155 and could result in employee exposure in excess of its dose or permissible limits(s);
e. Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work Permit
A written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

Immediately Dangerous to Life or Health (IDLH)
Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from the permit space.

Isolation
The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misarranging or removing sections of lines, pipes or ducts; a double block and clear system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Oxygen Deficient Atmosphere
An atmosphere containing less than 19.5 percent oxygen by volume.

Permit Required Confined Space or Permit Space
A confined space which has one or more of the following characteristics.

a. Contains or has a potential to contain a hazardous atmosphere;

b. Contains the material that has the potential for engulfing an entrant;
c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
d. Contains any other recognized serious safety and/or health hazard.

3.0 Responsibilities

3.1 Departments

a. Ensure all employees involved in confined space work are trained in the procedures of this program.
b. Provide and maintain equipment required to work in and ventilate a confined space.
c. Ensure that required safety procedures, including inspections and tests of the confined space, are conducted throughout the confined space operation by an employee qualified and trained in confined space operations.
d. Ensure that all employees working in the area are aware of confined space operations and that measures are taken to prevent inadvertent or unplanned entries.

3.2 Environmental Health & Safety

a. Establish and update requirements and written procedures for conducting confined space operations.
b. Provide training as requested by departments.
c. Review records of confined space entry permit and operations.
d. Provide consultation to departments upon request.

3.3 Employees

Employees are responsible for conducting their work activities in accordance with applicable rules, regulations and established policies and procedures.

4.0 Identification of Confined Space Locations

The following types of spaces should be considered confined spaces on campus:

- Boilers
- Manholes
- Tanks
- Vats
- Vessels
- Silos
- Pits
- Bins
- Pipelines
- Vaults

5.0 Confined Space Training

All employees involved in confined space operations must be properly trained on the hazards involved, their responsibilities/duties, completion of entry permits and entry, operating and emergency procedures.
Employees whose work is regulated by this program must be trained prior to being assigned duties, before there is a change in their duties, or whenever there is a change in the permit space operations for which the employee has not been trained. The training must allow the employee to acquire the understanding, knowledge and skills necessary to perform duties safely. The employer is required to certify that the training has been accomplished. The certification must contain the employee's name, signature or initials of the trainer and dates of training.

6.0 Entry Into Permit Required Confined Space

Prior to entry into any confined space the entrant must first:

a. Notify immediate supervisor.
b. Obtain a permit from a qualified entry supervisor.
c. Conduct atmospheric testing.
d. Assemble all required equipment.
e. Obtain the required number of attendants.
f. Coordinate communication.
g. Ensure emergency personnel are available.

6.1 Notification

All employees requiring entry into a confined space must notify their supervisor and a qualified entry supervisor prior to entry.

6.2 Entry Permits

Entry into a permit-required confined space shall be by permit only as approved by an entry supervisor. This permit is an authorization for entry under defined conditions for a stated purpose and duration. The entry supervisor will complete the permit and ensure all requirements of the permit are completed before employees enter the confined space. Permits are valid for up to twenty-four (24) hours. The completed permit must be made available to all permit space entrants at the site. The duration of the permit should not exceed the time required to accomplish the task. *The permits must be retained for at least one year.* Environmental Health and Safety should be notified prior to any confined space entries that are unusual or out of the ordinary.

6.3 Air Monitoring

The air must be monitored to determine whether dangerous air contamination - an atmosphere presenting a potential for death, disablement, injury, or acute or delayed illness - exists. This may result from one or more of the following causes:

a. Oxygen level less than 19.5% by volume (oxygen deficient) or greater than 23.5% by volume (oxygen enriched).
b. A flammable gas, vapor or mist in excess of 10% of its lower explosive limit (lower

flammable) limit.

c. Toxic, corrosive or asphyxiant substance(s) above the permissible exposure or ceiling level.
d. An airborne combustible particulate in excess of 10% of its minimum explosive concentration.
e. Any condition or air contaminate defined as immediately dangerous to life or health.

As a minimum, monitoring *must* include items (a), (b) and (c). Monitoring for any toxic substances that might be reasonably expected to exist or develop must also be performed. All testing must be performed by an entry supervisor or employee trained in using the approved equipment. All equipment must be used and calibrated according to manufacturers' instructions and all results recorded on the confined space entry permit. The serial number of the equipment shall be recorded on the permit.

6.4 Equipment

Obtain the following equipment:

a. Testing and monitoring equipment
b. Ventilation equipment needed to obtain acceptable entry conditions.
c. Communication equipment necessary to contact entrants and summon rescue personnel.
d. Personal protective equipment as needed.
e. Rescue equipment (tripod, winch, harness, etc.)

6.5 Duties of Authorized Entrants

The supervisor shall ensure that all authorized entrants:

a. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
b. Properly use equipment;
c. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space
d. Alert the attendant whenever:
    - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
    - The entrant detects a prohibited condition
e. Exit from the permit space as quickly as possible whenever:
    - An order to evacuate is given by the attendant or the entry supervisor.
    - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
    - The entrant detects a prohibited condition, or
    - An evacuation alarm is activated.
    - An alarm sounds in the monitoring equipment

6.6 Duties of Attendants

The entry supervisor shall ensure that each attendant:

a. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
b. Is aware of possible behavioral effects of hazard exposure in authorized entrants;
c. Continuously maintains an accurate count of authorized entrants in the permit space and ensures that means exist to identify authorized entrants;
d. Remains outside the permit space during entry operations until relieved by another attendant;
e. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;
f. Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
   - If the attendant detects a prohibited condition;
   - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
   - If the attendant detect a situation outside the space that could endanger the authorized entrants; or
   - If the attendant cannot effectively and safely perform all the duties required under this subsection (6.6);
g. Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
h. Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
   - Warn the unauthorized persons that they must stay away from the permit space;
   - Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
   - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
i. Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

6.7 Duties of Entry Supervisor

The department shall ensure that each entry supervisor:

1. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure
2. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
3. Terminates the entry and cancels the permit when necessary
4. Verifies that rescue services are available and that the means for summoning them are

operable;
5. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
6. Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

6.8 Prevention of Hazardous Conditions

No material or energy that may create a hazardous condition shall be permitted within the confined space. Lines shall be isolated by blanking, double blocking and bleeding, electrical lockout/tagout and blocking or disconnecting mechanical linkages in such a manner as to prevent inadvertent reconnection.
Work involving the use of flame, arc, spark or other source of ignition is prohibited within a confined space (or any adjacent space) which contains, or is likely to develop, dangerous air contamination due to flammable and/or explosive substances unless:

a. An inert atmosphere, using gases such as nitrogen, is used to prevent the ignition and the oxygen concentration is maintained at less than 10% of the concentration which supports combustion.
b. Sufficiently frequent testing of the oxygen content is performed to ensure that the oxygen remains less than 10% of the concentration which supports combustion.

6.9 Entry Under Hazardous Conditions

If the additional monitoring demonstrates that an atmosphere free of dangerous air contamination or oxygen deficiency cannot be ensured or in emergency situations when the appropriate provisions cannot be implemented, entry may be allowed only after evaluation by the Entry Supervisor or Environmental Health & Safety.

6.10 Emergency Rescue Procedures

Non-entry rescue is the preferred method for rescue of personnel from a permit required space. Employees will not enter a permit space for rescue unless they have been specifically trained and equipped for such rescue.

To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase overall risk of entry or would not be of value to any rescue. Retrieval system requirements are:

1. Each entrant shall use a chest or full body harness, with a retrieval line attached at the center of the back near shoulder level, or other appropriate point.
2. Other end of retrieval line shall be attached to a mechanical device or fixed point outside of permit space enabling immediate use.

3. A mechanical device will be used to retrieve personnel from vertical type permit spaces more than five feet deep.

If injured entrant is exposed to any substance with a required MSDS or similar document, that MSDS or document will be made available to the medical facility treating entrant.

If rescue should become necessary, the attendant will:

1. Immediately notify University Police by calling 911 or 756-2281. UPD will send a medically trained police officer and will dispatch fire/rescue resources

2. Attempt non-entry rescue procedures to the extent possible by the circumstances.

3. Monitor the situation and be ready to give rescuers information on how many victims and their status, what hazards, chemical types, concentrations, etc. are present.

7.0 Contractors

Contractors must comply with the confined space requirements of Cal OSHA.
Cal Poly is not responsible for the employees of any contractor who may enter University confined spaces.